together with liquid-tight rivets **240**, so that the closed container will have reasonably good environmental sealing. This combination provides a strong structure which uses only a single-layer shell for most of the lid area.

Details of the Body

In addition to the perspective of the container shown in FIGS. **1A–1B**, a bottom view of the body **100** of the container is shown in FIG. **3**. While the walls of the container body are generally cylindrical in shape, this is not the case with the angular base **110**, which provides anti-rolling stability. The base is here shown as having a generally square shape, but can be hexagonal, triangular, or any other shape which discourages rolling. The handles **106**, offset from the strapping grooves, are clearly seen. These handles are very heavy-duty, and have a 90 degree stop to prevent fingers being mashed between the handle and the wall of the container by heavy loads. The handles are attached to the container by studs, which are molded into the container as it is formed. Additionally, the walls of the container are somewhat thicker from near the outer edges of the handles downward, in order to provide a flat area for attachment of the handles.

In FIG. **3**, the base of the body is all that is visible, since this base is somewhat larger than the rest of the body. In addition the grooves which hold the strapping, a circular area **112** is indented into the base. When a container is stacked on top of a similar container, the protrusions **204** in the lid of the lower container will engage in the circular indentation **112** of the upper container. This prevents slippage between the relatively slick surfaces of the two containers.

Safety Issues

Several features of the preferred embodiment are designed to discourage unsafe handling practices. This is a particular challenge with bit sizes which have weights in the range from (e.g.) 30 to 300 pounds. In this intermediate zone of weights, manual handling is possible but workers are also likely to use lifting aids when available. This results in a challenge for bit package design: the package design should facilitate manual handling, but not encourage the use of lifting equipment in an unsafe manner. The preferred embodiment contains a number of innovations which address this concern.

For instance, the container with bit is preferably lifted, either manually or machine-assisted, using both handles. However, it has been assumed that under working conditions, workers will inevitably try to use a quicker method, such as attaching a lifting hook to only one handle, or worse, trying to use the strapping which holds the lid on as a lifting point.

To address the first of these lifting practices, the inventors tested a number of commercially available "heavy-duty" handles, which use an open loop of bent rod for the handle. These stock handles were strong enough for normal manual handling, but if the container snagged on other equipment while being machine lifted, one end of the loop can be pulled out of its restraint, allowing the whole package to fall. Instead, the handles are specially made, with the ends of the loop welded together. Even under much higher stress, these handles will not come open. For instance, although the bit and container will generally weigh little more than 300 pounds, each handle can handle at least 800 pounds pressure without breaking. Additionally, a stop on the handle keeps the loop from rotating more than about 90 degrees outward from the package. This provides a comfortable position for handling, but keeps fingers from being mashed between the handle and the container.

For the second of the bad lifting practices above, the fact that the strapping is recessed into grooves makes it much harder to simply slip a lifting hook through the strapping. Since this strapping is not designed to take this abuse, making this practice more difficult improves safety. The lip of the body contains indentations which register with corresponding shapes in the lid, to assure that the strap grooves in the body will align with those in the lid.

Another safety feature is the use of a conductive polymer material. The use of a conductive material minimizes static electricity, and thus the risks of explosion or fire on the rig floor.

Other Advantages

This package is not only very durable, but also relatively inexpensive to fabricate. The preferred package is durable enough that it can be reused if desired. Additionally, this design provides a reasonable range of tolerances as far as height of the bit is concerned. With a slip fitting lid, the lid does not need to be seated all the way down on the body, so a single package size can hold most normal roller cone bits of a given bore size. If desired, the sides of the lid can be designed to extend to just above the handles, allowing even more leeway for longer bits.

Example of Dimensions

At this time, the containers are being made in three sizes to accommodate the varying sizes of drill bits. Dimensions of the middle size container are given below as an example. This should not be taken to be a limitation on what can be done.

Total weight—10 lbs.
Weight of lid—3 lbs.
Weight of base—7 lbs.
Overall height—17½"
Diameter—11"
Height of lid—4½"
Depth of groove on lid—¾"
Depth of groove in bottom—⅜"
Height of protrusions on lid—¼"

Modifications and Variations

As will be recognized by those skilled in the art, the innovative concepts described in the present application can be modified and varied over a tremendous range of applications, and accordingly the scope of patented subject matter is not limited by any of the specific exemplary teachings given.

It is specifically contemplated that the disclosed inventions are not limited to roller cone bits, but can also be applied to drag bits. It is also specifically contemplated that the disclosed packaging devices and inventions are not limited to packaging of bits, but can be used for downhole motors, bent subs, workover tools, core bits, reamers, hole openers, or in other components motors, bent subs, or for other tools.

Further information on drill bits can be obtained from The Rotary Drilling Series, Unit I, Lesson 2: The Bit (fourth edition), published by the Petroleum Extension Service of The University of Texas at Austin in cooperation with the